

PI74ALVCHT16244

16-Bit Buffer/Driver with 3-State Outputs

Product Features

- PI74ALVCHT16244 is designed for low voltage operation
- $V_{CC}=2.3V$ to $3.6V$
- 5V I/O Tolerant
- Hysteresis on all inputs
- Typical VOLP (Output Ground Bounce)
 $<0.8V$ at $V_{CC}=3.3V$, $T_A=25^{\circ}C$
- Typical VOHV (Output VOH Undershoot)
 $<2.0V$ at $V_{CC}=3.3V$, $T_A=25^{\circ}C$
- Bus Hold retains last active bus state during 3-state
eliminates the need for external pullup resistors
- Industrial operation at $-40^{\circ}C$ to $+85^{\circ}C$
- Packages available:
 - 48-pin 240 mil wide plastic TSSOP (A)
 - 48-pin 300 mil wide plastic SSOP (V)

Product Description

Pericom Semiconductor's PI74ALVCH series of logic circuits are produced in the Company's advanced 0.5 micron CMOS technology, achieving industry leading speed.

The PI74ALVCHT16244 is a 16-bit buffer/driver designed for 2.3V to 3.6V V_{CC} operation.

The buffer/driver is designed specifically to improve both the performance and density of 3-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters.

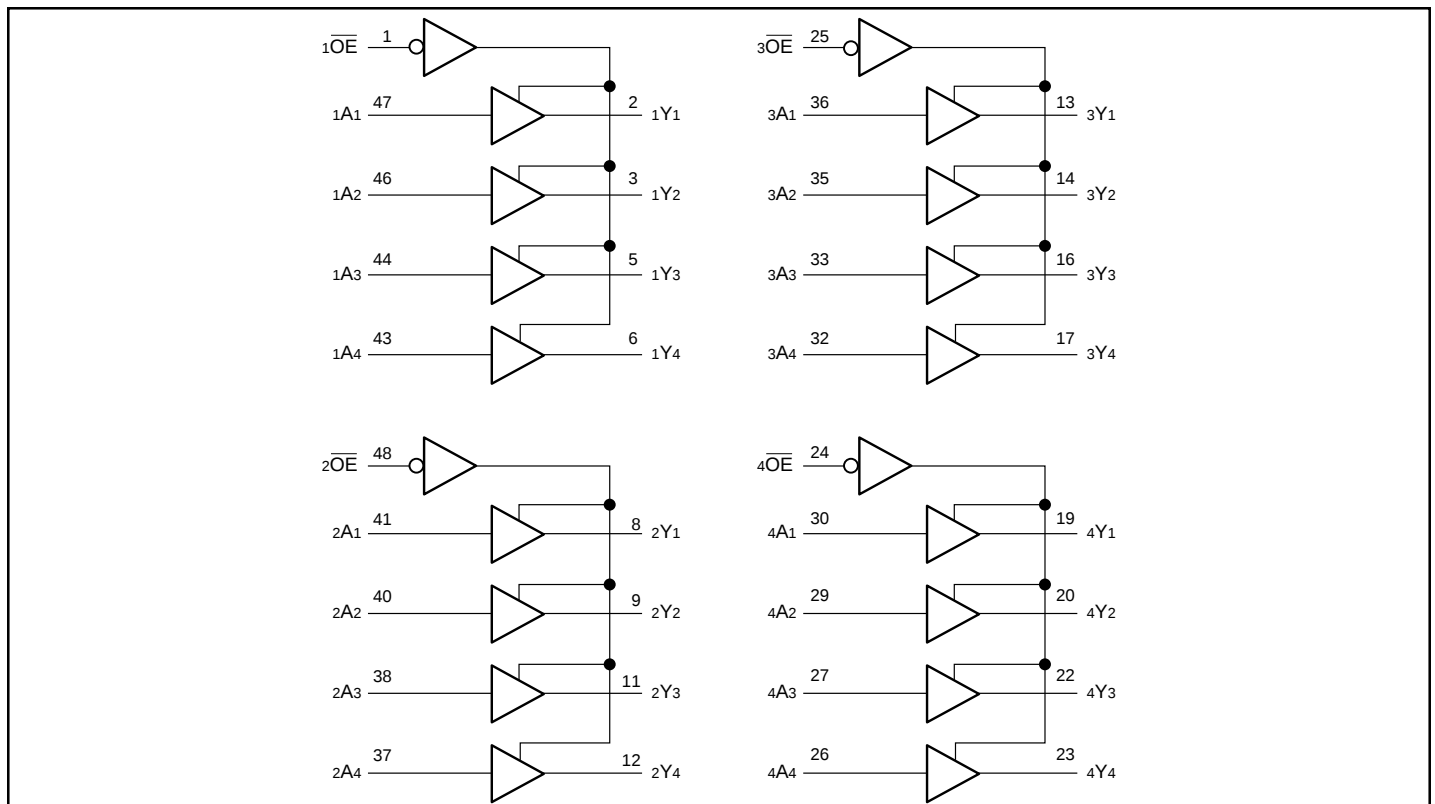
The device can be used as four 4-bit buffers, two 8-bit buffers, or one 16-bit buffer. It provides true outputs and symmetrical active-low output-enable ($\overline{OE}$) inputs.

To ensure the high-impedance state during power up or power down, $\overline{OE}$ should be tied to V_{CC} through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

The PI74ALVCHT16244 has "Bus Hold" which retains the data input's last state whenever the data input goes to high-impedance preventing "floating" inputs and eliminating the need for pullup/down resistors.

The PI74ALVCHT16244 can be driven from either 3.3V or 5.0V devices allowing this device to be used as a translator in a mixed 3.3/5.0V system.

Logic Block Diagram



Product Pin Description

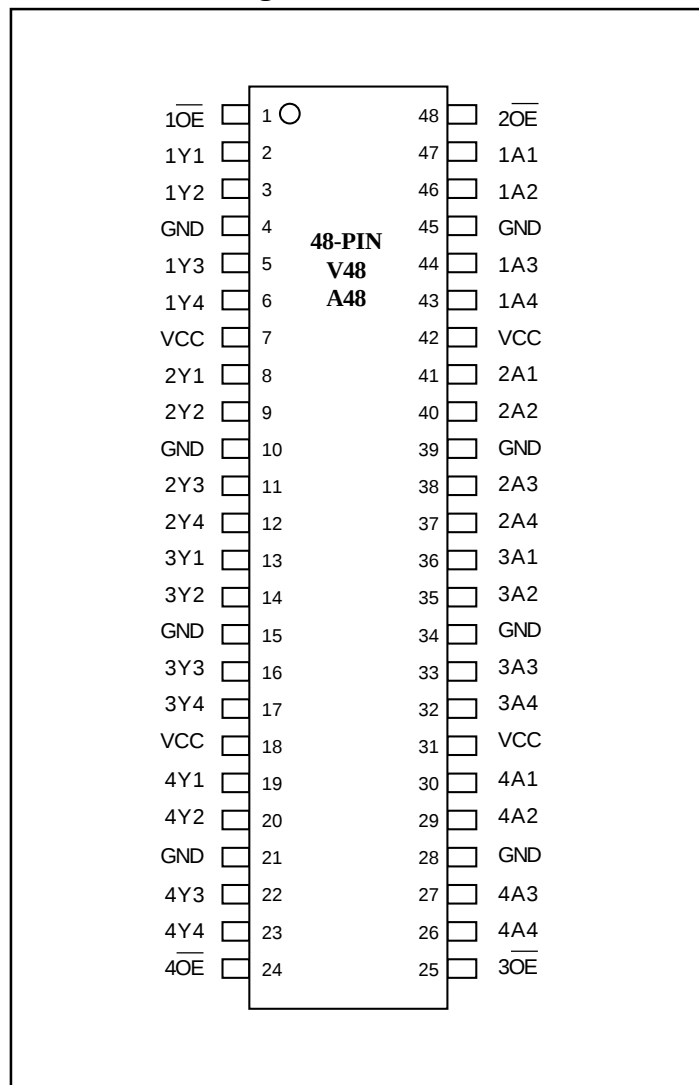
Pin Name	Description
$\overline{nOE}$	3-State Output Enable Inputs (Active LOW)
nAx	Inputs
nYx	3-State Outputs
GND	Ground
VCC	Power

Truth Table⁽¹⁾

Inputs		Outputs
$\overline{nOE}$	nAx	nYx
L	H	H
L	L	L
H	X	Z

Notes:

- H = High Signal Level
L = Low Signal Level
X = Don't Care or Irrelevant
Z = High Impedance

Product Pin Configuration

Maximum Ratings

(Above which the useful life may be impaired. For user guidelines, not tested.)

Storage Temperature	-65°C to +150°C
Ambient Temperature with Power Applied	-40°C to +85°C
Input Voltage Range, V_{IN}	-0.5V to +6.0V
Output Voltage Range, V_{OUT}	-0.5V to +6.0V
DC Input Voltage	-0.5V to +6.0V
DC Output Current	50 mA
Power Dissipation	1.0W

Note:

Stresses greater than those listed under MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

DC Electrical Characteristics (Over the Operating Range, $T_A = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$, $V_{CC} = 3.3\text{V} \pm 10\%$)

Parameters	Description	Test Conditions ⁽¹⁾	Min.	Typ. ⁽²⁾	Max.	Units
V_{CC}	Supply Voltage		2.3		3.6	V
$V_{IH}^{(3)}$	Input HIGH Voltage	$V_{CC} = 2.3\text{V to } 2.7\text{V}$	1.7		5.5	V
		$V_{CC} = 2.7\text{V to } 3.6\text{V}$	2.0		5.5	V
$V_{IL}^{(3)}$	Input LOW Voltage	$V_{CC} = 2.3\text{V to } 2.7\text{V}$			0.7	V
		$V_{CC} = 2.7\text{V to } 3.6\text{V}$			0.8	V
$V_{IN}^{(3)}$	Input Voltage		0		5.5	V
$V_{OUT}^{(3)}$	Output Voltage		0		5.5	V
V_{OH}	Output HIGH Voltage	$I_{OH} = -100\mu\text{A}$, $V_{CC} = \text{Min. to Max.}$	$V_{CC} - 0.2$			V
		$V_{IH} = 1.7\text{V}$, $I_{OH} = -6\text{mA}$, $V_{CC} = 2.3\text{V}$	2.0			
		$V_{IH} = 1.7\text{V}$, $I_{OH} = -12\text{mA}$, $V_{CC} = 2.3\text{V}$	1.7			
		$V_{IH} = 2.0\text{V}$, $I_{OH} = -12\text{mA}$, $V_{CC} = 2.7\text{V}$	2.2			
		$V_{IH} = 2.0\text{V}$, $I_{OH} = -12\text{mA}$, $V_{CC} = 3.0\text{V}$	2.4			
		$V_{IH} = 2.0\text{V}$, $I_{OH} = -24\text{mA}$, $V_{CC} = 3.0\text{V}$	2.0			
V_{OL}	Output LOW Voltage	$I_{OL} = 100\mu\text{A}$, $V_{IL} = \text{Min. to Max.}$			0.2	V
		$V_{IL} = 0.7\text{V}$, $I_{OL} = 6\text{mA}$, $V_{CC} = 2.3\text{V}$			0.4	
		$V_{IL} = 0.7\text{V}$, $I_{OL} = 12\text{mA}$, $V_{CC} = 2.3\text{V}$			0.7	
		$V_{IL} = 0.8\text{V}$, $I_{OL} = 12\text{mA}$, $V_{CC} = 2.7\text{V}$			0.4	
		$V_{IL} = 0.8\text{V}$, $I_{OL} = 24\text{mA}$, $V_{CC} = 3.0\text{V}$			0.55	
$I_{OH}^{(3)}$	Output HIGH Current	$V_{CC} = 2.3\text{V}$			-12	mA
		$V_{CC} = 2.7\text{V}$			-12	
		$V_{CC} = 3.0\text{V}$			-24	
$I_{OL}^{(3)}$	Output LOW Current	$V_{CC} = 2.3\text{V}$			12	mA
		$V_{CC} = 2.7\text{V}$			12	
		$V_{CC} = 3.0\text{V}$			24	
I_{IN}	Input Current	$V_{IN} = V_{CC}$ or GND, $V_{CC} = 3.6\text{V}$			± 5	μA
$I_{IN} \text{ (HOLD)}$	Input Hold Current	$V_{IN} = 0.8\text{V}$, $V_{CC} = 3.0\text{V}$	75			
		$V_{IN} = 2.0\text{V}$, $V_{CC} = 3.0\text{V}$	-75			
		$V_{IN} = 0$ to 3.6V , $V_{CC} = 3.6\text{V}$			± 500	
I_{OZ}	Output Current (3-State Outputs)	$V_{OUT} = 5.5\text{V}$ or GND, $V_{CC} = 3.6\text{V}$			± 10	μA
I_{CC}	Supply Current	$V_{CC} = 3.6\text{V}$, $I_{OUT} = 0\mu\text{A}$, $V_{IN} = \text{GND or } V_{CC}$			40	μA
ΔI_{CC}	Supply Current per Input @ TTL HIGH	$V_{CC} = 3.0\text{V to } 3.6\text{V}$ One Input at $V_{CC} - 0.6\text{V}$ Other Inputs at V_{CC} or GND			750	μA
C_I	Control Inputs	$V_{IN} = V_{CC}$ or GND, $V_{CC} = 3.3\text{V}$		3		pF
	Data Inputs			6		
C_O	Outputs	$V_O = V_{CC}$ or GND, $V_{CC} = 3.3\text{V}$		7		pF

Notes:

1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at $V_{CC} = 3.3\text{V}$, $+25^{\circ}\text{C}$ ambient and maximum loading.
3. Unused Control Inputs must be held HIGH or LOW to prevent them from floating.

Switching Characteristics over Operating Range⁽¹⁾

Parameters	From (INPUT)	To (OUTPUT)	$V_{CC} = 2.5\text{ V} \pm 0.2\text{ V}$		$V_{CC} = 2.7\text{ V}$		$V_{CC} = 3.3\text{ V} \pm 0.3\text{ V}$		Units
			Min. ⁽²⁾	Max.	Min. ⁽²⁾	Max.	Min. ⁽²⁾	Max.	
t_{PD}	A	Y	1.0	5.0		4.0	1.0	3.6	ns
t_{EN}	$\overline{OE}$	Y	1.0	6.8		6.0	1.0	5.0	
t_{DIS}	$\overline{OE}$	Y	1.0	6.0		5.2	1.0	5.0	
Description									
$\Delta t/\Delta v^{(3)}$	Input Transition Rise or Fall		0	10	0	10	0	10	ns/V

Notes:

1. See test circuit and wave forms.
2. Minimum limits are guaranteed but not tested on Propagation Delays.
3. Recommended operating condition.

Operating Characteristics, $T_A = 25^\circ\text{C}$

Parameters		Test Conditions	$V_{CC} = 2.5\text{V} \pm 0.2\text{V}$	$V_{CC} = 3.3\text{V} \pm 0.3\text{V}$	Units
			Typical	Typical	
C_{PD} Power Dissipation Capacitance	Outputs Enabled	$C_L = 50\text{pF}$ $f = 10\text{ MHz}$	16	19	pF
	Outputs Disabled		4	5	